

SOV/149-58-5-6/18

Investigation of the Interfacial Tension at the Metal-electrolyte Boundary During Electrolytic Extraction and Refining of Aluminium

electrolyte reacting with the metal, the maximum pressure varied during each experiment. The graphs illustrating the variation of σ_M were constructed for the minimum observed values of the maximum pressure.

The effect of the AlF_3 content in an electrolyte consisting of $(NaF, AlF_3) + 8$ to $10\% Al_2O_3$ on σ_M at $1000^\circ C$ is shown in Figure 3. The effect of the Al_2O_3 content on σ_M at $900^\circ C$ is shown in Figure 4: Curve 1 - electrolyte consisting of $28.6\% AlF_3$ $71.4\% NaF$ (molecules);

Curve 2 - chiolite ($5 NaF.3AlF_3$). The effect of additions of BeF_2 , AlF_3 , MgF_2 , $BaCl_2$, BaF_2 , CaF_2 , LiF , $LiCl$, $NaCl$ and KF to an electrolyte consisting of $28.6\% AlF_3$ and $71.4\% NaF$ (molecules) + $12\% Al_2O_3$ on σ_M at $1000^\circ C$ is shown in Figure 5. The effect of $BaCl_2$ on

Card3/9 σ_M of the system ($70\% Al + 30\% Cu$)/chiolite at $800^\circ C$ is

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shown in Figure 6. Variation of σ_M of the system (70% Al + 30% Cu)/(NaF, AlF_3) + 60% $BaCl_2$ with the varying AlF_3 content is illustrated in Figure 7. The effect of additions of AlF_3 , LiF, NaCl and NaF on σ_M of the system (70% Al + 30% Cu)/chlomite + 60% $BaCl_2$ at 800 °C is shown in Figure 8.

The relationship between σ_M of the system Al/electrolyte at 800 °C and the concentration of F^- and Al^{3+} ions is illustrated in Figure 9: Curve 1 - electrolyte : NaCl; F^- replaces Cl^- ; Curve 2 - electrolyte : KCl/NaCl eutectic; F^- replace Cl^- ; Curve 3 - electrolyte : KCl + NaCl + NaF; concentration of F^- ions remains constant, Al^{3+} replaces Na^+ until all F^- ions are combined with the Al^{3+} ions; Curve 4 - electrolyte : KCl + NaCl + AlF_3 eutectic. The effect of the cathodic

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current density on σ_M of the system metal/electrolyte is shown in Figure 10: Curve 1 - KCl + NaCl eutectic, 800 °C; Curve 2 - KCl + NaCl eutectic + 1 mol.% AlF_3 , 800 °C; Curve 3 - (chiolite + 60% $BaCl_2$)/(70% Al + 30% Cu); 800 °C; Curve 4 - (28.6 mol.% AlF_3 + 71.4 mol.% NaF) + 5% Al_2O_3 , 1 000 °C; Curve 5 - Swiss electrolyte/(70% Al + 30% Cu), 800 °C. Finally, Figure 11 shows the effect of 10 mol.% additions of KF , NaF, LiF, BaF_2 , CuF_2 , MgF_2 and BeF_2 to the electrolyte consisting of 28.6 mol.% AlF_3 and 71.4 mol.% NaF + 5% Al_2O_3 on the quantity of aluminium (g/100 g of melt/hr) lost in the electrolyte (the effect of these additions is correlated with the "strength" of the corresponding cations expressed in terms of a quantity postulated by Semechenko who termed it "generalised moment" of the cation. It is equal to $m = ez/r$, where e - electron charge, z - number of charges in the cation

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and r - cation radius).

The results of the present investigation can be summarised
as follows:

- 1) depending on the composition of the electrolyte, the
value of σ_M of the system aluminium/electrolyte can vary
between 330^M and 800 dynes/cm;
- 2) the surface activity of the cations increases with the
decreasing value of the generalised moment. The surface
activity of the studied anions (Cl^- , F^- , O^{2-}) increases
when their generalised moment increases;
- 3) the surface activity of various additions depends to a
large extent on the composition of the electrolyte;
- 4) "strong" ions affect σ_M by formation of complex ions
and by changing the structure of the melt;
- 5) the slope of the electro-capillary curves (Figure 10)
indicates that the surface of aluminium in contact with
fused fluorides and chlorides is negatively charged (in the
absence of an external field). In the case of fluoride

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electrolytes with a high AlF_3 content the value of σ_M of aluminium decreases very slightly even at high values ($2-3 \text{ A/cm}^2$) of the cathodic current density; 6) as regards the problem of the optimum composition of the electrolyte, σ_M of aluminium in contact with the NaF-AlF_3 electrolyte does not change much when the molar ratio NaF/AlF_3 varies from 3 to 2.5 but increases rapidly with further increase of the AlF_3 content (Figure 3). However, an increase of the AlF_3 content in acid electrolytes increases the losses of aluminium. Industrial electrolytes most often contain additions of CaF_2 and MgF_2 . The results of the present investigation indicate that the beneficial effect of these additions, particularly CaF_2 , is more pronounced in alkaline (with a high NaF content) than in acid electrolytes. The value of σ_M

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can be also increased by additions of LiF , LiCl , BaCl_2 and BaF_2 , chlorides being more effective than fluorides. Even more effective in this respect is BeF_2 . However, if, as has been postulated - the presence of Be^{2+} ions results in the change of the structure of the melt (destruction of AlF_6^{3-} anions with the corresponding increase in the concentration of Al^{3+} ions) introduction of BeF_2 in the electrolyte would not be advisable, particularly in view of the toxicity and stability of beryllium compounds. On the other hand, if the fact that losses of aluminium are slightly higher in the presence of Be^{2+} than in the presence of Ca^{2+} is due to variation of the rate of removal of dissolved aluminium, addition of BeF_2 should result in considerable reduction of losses of aluminium

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in industrial electrolytes. As to the electrolytes for
refining aluminium, the value of σ_M will increase with
decreasing value of the molar ratio NaF/AlF_3 and with the
increasing BaCl_2 content.

There are 11 figures and 11 references, 9 of which are
Soviet and 2 English.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota.
Kafedra metallurgii legkikh metallov.
(Moscow Institute of Non-ferrous Metals and Gold.
Chair of Metallurgy of Light Metals)

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AUTHOR: Gerasimov, A.D. SOV/149-58-6-17/19

TITLE: Conference on Surface Phenomena in the Liquid State
(Konferentsiya po poverkhnostnym yavleniyam v rasplavakh)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya
Metallurgiya, 1958, Nr 6, p 143 (USSR)

ABSTRACT: Surface phenomena in molten metals, slags and salts were the subject of the conference held on June 25-26, 1958 at the IONKh AN SSSR (Institute of General and Inorganic Chemistry, Ac.Sc. USSR). V.I. Yeremenko and V.I. Nizhenko (Kiyev) reported the results of high-accuracy measurements of the surface tension of the molten metals by the sessile drop method. They had found that the surface tensions of cobalt and nickel were 1 812 and 1 782 erg/cm², respectively. Carbon, while not affecting the surface tension of cobalt, caused a rapid increase of the interfacial tension between Co and Al₂O₃. The interfacial tension between pure Co and Al₂O₃ was unexpectedly high and amounted to 2 100 erg/cm². Yu.B. Naydich (Kiyev) discussed the surface and interfacial activity of oxygen in copper

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and nickel. This had been found to be quite high, 1% O_2 being sufficient to reduce the surface tension of copper from 1370 to 530 erg/cm². Adsorption of oxygen at the metal-MgO and particularly metal- Al_2O_3 boundary was higher than at the metal-gas interface which indicated high affinity of oxygen to these oxides. S.I. Popel' (Ural'skiy politechnicheskiy institut - Ural Polytechnic Institute) described a method of studying the interfacial tensions at the iron-slag boundary based on X-ray photography of sessile drops and graphical interpretation of the basic equation of the drop surface. According to this author, the increase of the interfacial tension at the iron-slag interface brought about by CaO and Al_2O_3 is small in comparison with that caused by SiO_2 . The surface activity of various constituents of the metallic phase had been found to increase in the following order: Mn, C, P, Si and S. In the presence of FeO, MnO and FeS, the interfacial tension rapidly increases. A.D. Gerasimov and A.I. Belyayev (Moscow Institute of Non-ferrous Metals and Gold) presented a paper describing an investigation on the

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interfacial tension between aluminium (or its alloys) and fused salts, such as are used in electrolytic refining of aluminium. Using both the sessile-drop method (X-ray photography) and the maximum bubble pressure method, these authors established that with the changing composition of the electrolyte the interfacial tension between aluminium and the electrolyte can change rapidly from 300 to 800 erg/cm². The surface activity of the cations was found to increase with decreasing magnitude of their electrostatic force (charge/radius ratio), the converse being true in the case of anions. Yu.P. Nikitin (Sverdlovsk) reported the results of an investigation (by electrochemical methods) of the mechanism of the boundary formation between molten sulphides and silicates. Finally, various methods of calculating the interfacial tension were discussed by P.P. Pugachevich.

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AUTHORS: Gerasimov, A. D., Belyayev, A. I.

TITLE: Surface Activity at Interface Metal/Melt and Energy of Crystal Lattice

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Tsvetraya metallurgiya, 1959, Vol 2, Nr 5, pp 45-49 (USSR)

ABSTRACT: Interface tension is a subject little studied, especially with regard to fused media. A theoretical analysis of surface activity among components in complex systems is difficult; most authors use for this purpose the "generalized moment" as suggested by Sem-enchenko, V. K. For ions it is:

$$m = \frac{e^2}{r}, \quad (1)$$

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where e is the electron charge, z is the number of ion charges, and r is its radius. Yesin, O. A., Popel', S. I., compared the surface tension of fused oxides with the energy of the cation-oxygen bond in the melt. Further, they calculated the total molecular energy according to Born-Haber cycle, while the electrostatic part of this energy was calculated according to the formula of Kapustinskiy, A. J.:

$$U_x^m = \left[256(z_c z_a x^2) / (r_c + r_a) \right] (a + b) \quad (2)$$

where z_c and z_a are valences of the ions; r_c and r_a are their radii; a and b are the numbers of cations and anions in an oxide molecule; and x is the degree of the ionic bonding. It appears that even when the degree of co-valent bonding is considerable ($x = 0.5$), the electrostatic part of the energy is 80 to 90% of the total bonding energy. From the total molar energy

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U^m the authors derived the energy of one bond of a gram-

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ion of metal U^b : $U^b = 2U^m/A(a + b)$, where A is Madelung's constant. They also derived the energy of one gram-equivalent: $U^g = U^m/az_c$. The above characteristics were compared to the experimental data given in Table 1, and discrepancies were observed. In the table $\Delta\sigma_{me}$ is the changing interface tension at the boundary of molten aluminum and of a melt of 49% NaF, 39% AlF_3 , 12% Al_2O_3 with 5% of different compounds added; m_c is the ion potential ("generalized moment") of the cations; U^m is the molar energy of the crystal lattice (Born-Haber); U^b is the one-bond energy of a gram-ion of metal, as computed on the base of U^m (Formula (3)); U^g is the crystal lattice energy of one gram-equivalent. U_x^m , U_x^b and U_x^g are fully analogical to U^m , U^b and U^g , but they are calculated in accordance with the degree of ionic

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bond as per Kapustinskiy's formula ($U^E = U^m / az_c$):

$$U_m^u = 287,2 \frac{z_c z_a x^2}{r_c + r_a} (a + b) \left(1 - \frac{\rho}{r_c + r_a} \right), \quad (5)$$

where $\rho = 0.345 - 0.00435(r_c + r_a)^2$. Other quantities are as per formula (2). Surface tension is the energy of interaction between the substance apportioned to a unit area of surface, and the phase volumes. Therefore the authors consider it more correct to express the surface activity of compounds as compared to the energy of their crystal lattice, in terms of area units of surface rather than of mass (gram-molecule or gram-equivalent). The energy of crystal lattice proportional to U^σ is calculated according to the formula:

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$$U^\sigma(U_i^\sigma) = \frac{U^u(U_i^u)}{V_i^{2/3}}, \quad (6)$$

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where V_m is the molecular volume of matter. The authors call $U\sigma$ the energy of crystal lattice as referred to a unit of surface area. The experimental methods resulting in the figures of Table 1 are described by the authors in the same Journal (Nr 5, 50, 1958). When one cation in the added salt is substituted for another cation, the interface tension rises (while its surface activity decreases) with the rise in $U\sigma$ of the added salt. When substances have the same cation, the interface tension decreases (while the surface activity increases) with the rise of the $U\sigma$ of the added salt. Antonov's rule ($\sigma_{me} = \sigma_m - \sigma_e$) is not applicable if cations are substituted for other cations, when $\Delta\sigma_e > \Delta w_{me}$ where the latter term is a change in adhesion work among the liquid phases. Conversely, Antonov's rule is applicable if $\Delta\sigma_e < w_{me}$ when anions are substituted for other anions. Both relations are confirmed experimentally. Furthermore, in

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TABLE 1 75382 SOV/149-2-5-8/32

Cmpr'son of exp. data on interface tension w/var. calc'd characteristics

Added Temp Char-act'g	KF	NaF	BaF ₂	LiF	CaF ₂	MgF ₂	AlF ₃	BeF ₂	KCl	NaCl	LiCl	BaCl ₂	Al ₂ O ₃
ΔT_{me}	-28	-8	+14	+19	+23	+34	+39	+86	-18	-8	+11	+30	0
$m \cdot 10^3$	3,6	4,9	6,7	6,15	9,05	12,3	25,3	28,2	3,6	4,9	6,15	6,7	25,3
U^m	190,4	215,0	517,1	240,1	617,2	668,8	1440,0	835,0	161,4	180,4	193,3	478,3	3618,0
U^b	109,0	128,0	209,0	137,2	235,5	262,0	411,5	315,0	94,1	103,0	110,5	182,0	827,0
U^g	190,4	215,0	273,5	240,1	808,6	344,4	480,0	413,0	164,4	180,4	193,3	239,1	603,0
x	0,93	0,91	0,91	0,90	0,89	0,84	0,77	0,79	0,70	0,65	0,61	0,65	0,6
U^m_x	164,8	177,1	459,0	186,0	494,0	489,0	900,0	515,0	81,0	77,5	77,1	203,5	1398,0
U^b_x	94,25	101,3	175,0	106,3	188,0	186,0	260,0	196,1	46,4	44,4	44,1	77,5	320,0
U^g_x	164,8	177,1	220,5	186,0	247,0	244,5	300,0	257,5	81,0	77,5	77,1	101,7	733,0
V_m	23,4	16,4	37,4	11,3	24,6	21,8	27,1	23,4	37,6	27,0	20,5	52,8	25,5
U^g	23,3	33,4	38,9	47,8	58,1	70,2	110,0	80,1	14,7	20,0	25,8	26,9	230,0
U^g_x	20,1	27,5	32,7	37,1	46,5	49,8	69,0	50,0	7,24	8,6	10,3	11,5	88,6

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accordance with Antonov's rule, it was confirmed that the surface activity increases in the following sequence: chlorides, fluorides, oxides. There is 1 table; and 8 Soviet references.

ASSOCIATION: Krasnoyarsk Institute of Nonferrous Metals. Chair of Light Metals Metallurgy (Krasnoyarskiy institut tsvetnykh metallov. Kafedra metallurgii legkikh metallov)

SUBMITTED: February 2, 1959

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KONTSEVOY, Yu.A.; KUDIN, V.D.; GERASIMOV, A.D.; ASVADUROVA, Ye.I.;
TATARENKOV, A.I.; KUDRYAVTSEVA, V.F.

Apparatus for measuring the electrophysical properties of semi-
conducting materials. Zav.lab. 29 no.11:1397-1399 '63.
(MIRA 16:12)

HUYNOV, N.N.; LERINMAN, R.M.; GERASIMOV, A.P.

Electron microscopic investigation of the initial stages of destruction of supersaturated solid solutions in aluminum-base alloys.
Part 3. Aging of aluminum-magnesium-silicon (1.4% MgSi) alloys.
Trudy Ins. fiz.met. no.14:13-15 '54. (MIRA 8:4)
(Aluminum-magnesium alloys--Metallography)

GERASIMOV, A. F.

Gerasimov, A. F.

"Investigation of the phenomenon of internal adsorption on the boundary of an aluminum-silver alloy with an oxide film by a method based on the use of the radioactive isotope Ag-110." ^{in Higher Education USSR.} Ural State U imeni A. M. Gor'kiy. Sverdlovsk, 1956 (Dissertation for the degree of Candidate in Physicomathematical Science)

Knizhnaya letopis'
No. 25, 1956. Moscow

USSR / Diffusion. Sintering.

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Abs Jour : Ref Zhir - Fizika, No 4, 1957, No 9339

Author : Arkharov, V.I., Gerasimov, A.F., Gruzin, P.I.

Inst : Ural'University USSR

Title : Investigation of the Phenomenon of Internal Adsorption on the Boundary of an Aluminum Silver Alloy with Oxide Film, Using the Radioactive Isotope Method.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 2, 294-302

Abstract : Plates of the alloy Al -- 0.29% Ag, containing a small amount of radioactive isotope Ag^{110} were subjected to a six-hour exposure at 550° in vacuum (10^{-2} -- 10^{-3} mm mercury) to obtain a thin (50 -- 100 Å) oxide film, and to rapid cooling. After this, successive layers 500 -- 600 Å thick were etched away from the specimen (the thickness of the removed layer was estimated from the decrease in weight of the specimen), and each layer was etched away in a dif-

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Abs Jour : Ref Zhur - Fizika, No 4, 1957, No 9339

Abstract : ferent vessel. Such treatment was carried out cyclically 18 times until there was accumulated in all the vessels a sufficient amount of etching products, and after which the etching products were evaporated and their activity measured. It turned out that the first (surface) layer is somewhat poorer in silver, compared with the average contents of the silver in the alloy, which can be explained by the floating away of the silver atoms into the specimens as a result of the oxidation of the surface. The second and 3rd layers have considerably more silver compared with its average contents in the alloy. This enrichment cannot be attributed to selective oxidation of the alloy and must be ascribed to the internal adsorption of silver in the transition zone between the oxide and metal. The thickness of the transition zone, according to the described experiments, is estimated to be 1,600 -- 1,800 A.

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E111/E352

AUTHORS: Asanova, M.P., Gerasimov, A.F. and Konev, V.N.

TITLE: Investigation of Diffusion⁶ with Reaction in "Metal-Complex Gas" Systems. III. The System Nb-(B + N)

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 5, pp 689 - 694 (USSR)

ABSTRACT: This is a continuation of a series of investigations on diffusion with reaction in systems of the type "metal - mixture of two chemically active gases" (Refs 1-5). It deals with niobium²¹, boron²¹ and nitrogen²¹ and begins with a study of the binary niobium-boron system for which insufficient data are available (Refs 6,7). Work on reaction diffusion in this binary system (Refs 6,7,16) has so far mainly dealt with the thermodynamics of the process. In the present investigation the authors used 5 x 5 x 20 mm parallelepiped specimens of niobium suspended by molybdenum wire in a porcelain tube to which BCl₃ could be supplied with or without hydrogen²¹, molecular nitrogen and/or ammonia. The apparatus is shown in Figure 1. Figure 2 shows the squares of increase in weight

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Investigation of Diffusion with Reaction in "Metal-Complex Gas"
Systems. III. The System Nb-(B + N)

of specimens as functions of time for $\text{BCl}_3 + \text{H}_2$ at 700 to 1 200 °C. The logarithms of the parabolic constants of these curves are plotted against reciprocal of the absolute temperature in Figure 3 and their values are given in Table 2. Table 1 gives the number of phases detected metallographically, the results of X-ray phase analysis and the growth law of the diffusion layer: there was no texture in the scale layers. It was found that reaction diffusion in a $(\text{BCl}_3 + \text{H}_2)$ atmosphere

attained appreciable speed at 700 °C and follows the parabolic time law for the whole range up to 1 200 °C. Rate-constant changes had no simple linear relation with temperature: apparent activation energy rises continuously with temperature. Introduction of ammonia into the atmosphere had no effect on the course of the process and nitrogen took no part in the diffusion. The work showed that in the niobium-boron system reaction diffusion is mainly by boron atoms through the chemical-reaction products

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to the metal. Without hydrogen $\text{BCl}_3 + \text{N}_2$ gives rise to volatile compounds of niobium with chlorine. Boride coatings protect niobium from the action of hydrochloric, sulphuric and nitric acids at room temperature but not from oxidation at $1\,000^\circ\text{C}$ and over. Professor V.I. Arkharov advised in the discussion of results. There are 4 figures, 2 tables and 19 references, 13 of which are Soviet, 3 English, 1 German and 2 Scandinavian.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M. Gor'kogo
(Ural State University imeni A.M. Gor'kiy)

SUBMITTED: November 12, 1959

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S/126/60/009/05/008/025
E111/E352

AUTHORS: Arkharov, V.I., Konev, V.N. and Gerasimov, A.F.

TITLE: Investigation of Diffusion¹ with Reaction in "Metal -
Complex Gas" Systems. IV. The System Molybdenum¹nitrogen-
carbon¹

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 5,
pp 695 - 700 (USSR)

ABSTRACT: This reports a further investigation by this school on
diffusion with reaction in systems of the "metal -
mixture of two chemically-active gases" type (Refs 1-7).
V. Negodyayev and G. Tatymov participated in the
experiments, which were carried out on the binary
molybdenum-nitrogen (method described in Refs 15, 16) and
molybdenum-carbon systems (method described in Refs 11,12)
and then on the ternary molybdenum-nitrogen-carbon system
(method described in Refs 3,4). Figure 1 shows increases
in weight of molybdenum specimens in ammonia vapour as
functions of time for 700 - 1 120 °C, Figure 3 the
corresponding curves for a benzene-hydrogen atmosphere
at 1 000 - 1 200 °C, and Figure 4 for a benzene-ammonia
atmosphere at 1 000 - 1 200 °C. The dependence of the

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logarithm of the parabolic constant on reciprocal of absolute temperature is shown for all the systems in Figure 2 and the values of the constant are given in Table 2. The lines consist of three straight sections and the authors give a physical interpretation of this. Table 1 gives for all the systems the number of layers detected metallographically, the results of phase X-ray analyses and the presence or absence of texture at the various temperature ranges. Texture was found only in Mo-C at 1 200 °C. The work showed that molybdenum-nitrogen reaction in an ammonia atmosphere proceeds appreciably at 700 °C following the parabolic law up to 1 150 °C, above which molybdenum nitrides were not formed. At 700 - 940 °C a scale of an outer layer of MoN with a simple hexagonal lattice and an inner layer of Mo₂N with a face-centred cubic lattice was produced. There was no reaction between molybdenum and molecular nitrogen at atmospheric pressure and 600 - 1 200 °C. The reaction with carbon (from benzene + hydrogen) proceeded appreciably at

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1 000 °C following the parabolic law up to 1 200 °C and producing a single diffusion layer consisting of Mo_2C with a hexagonal lattice. Diffusion in the ternary system also follows the parabolic law at 1 000 - 1 200 °C, giving a single diffusion layer consisting of $\text{Mo}_2(\text{C}_{1-x}\text{N}_y)$ with a Mo_2C lattice. The work showed that in all the systems there is a preferential diffusion of nitrogen and carbon atoms to the metal through the reaction products, Nitriding is quicker than carburization and the rate of the combined process is intermediate with nitrogen accelerating carbon diffusion into molybdenum. There are 4 figures, 2 tables and 16 references. 15 of which are Soviet and 1 German.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet imeni A.M. Gor'kogo (Ural State University imeni A.M. Gor'kiy)

SUBMITTED: December 23, 1959

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E111/E435

AUTHORS: Gerasimov, A.F., Konev, V.N. and Timofeyeva, N.F.
TITLE: Investigation of Reaction Diffusion in "Metal-Complex
Gas" Systems. VI. The System Tungsten-Carbon-Nitrogen
PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4,
pp.596-600

TEXT: This work deals with reaction diffusion in the systems W-C, W-N and W-C-N at temperatures up to 1200°C including kinetic studies of carbiding, nitriding and carbonitriding and X-ray determination of the phase composition of the products. It is a continuation of the work of these and other workers of the Arkharov school in this field (Ref.1-9). No such investigation on the W-C-N system has been reported. For W-C reaction diffusion was effected by previously described methods (Ref.8,16). The reaction with a paraffin-hydrogen atmosphere starts to become appreciable at 1000°C and, as do the other reactions studied, it follows the parabolic time law up to the maximum temperature (1200°C). The outer layer was found metallographically and by X-ray diffraction to consist of WC and the inner of W₂C. No texture in the first

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21365

Investigation of Reaction ...

S/126/61/011/004/014/023
E111/E435

was found. The diffusion was uni-directional, from gas through scale to the metal. Reaction of tungsten with ammonia in a previously-described apparatus became appreciable at 1000°C, giving an outer layer of WN and an inner of W₂N. Additional experiments confirmed that the upper temperature limit for the existence of these phases in an ammonia atmosphere is 1100 to 1200°C. For the ternary system, the method was similar to that previously used (Ref.3,8). X-ray diffraction showed that the diffusion layer on tungsten annealed in a mixture of paraffin vapour and ammonia is again WC and W₂C; but the presence of nitrogen in the atmosphere (although carbon partial pressure is unchanged) retards carbon diffusion in tungsten. This is contrary to observations on Cr-C-N (Ref.3,4), Mo-C-N (Ref.8) and Fe-C-N (Ref.20) and is not explicable in terms of activation energies of diffusion for carbon and nitrogen. The authors conclude from their diffusion studies on W-C-N systems that there is preferential diffusion of nitrogen and carbon through reaction products in all these systems. Professor V.I.Arkharov showed an interest in this work. There are 2 figures, 1 table and 20 references: 18 Soviet and 2 non-Soviet.

Card 2/3

21365

Investigation of Reaction ...

S/126/61/011/004/014/023
E111/E435

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im. A.M.Gor'kogo
(Ural State University imeni A.M.Gor'kiy)

SUBMITTED: July 28, 1960

Card 3/3

10-8300

32659

S/126/61/012/005/019/028

E073/E535

AUTHORS: Arkharov, V.I., Gerasimov, A.F. and Ushkova, T.V.

TITLE: On high temperature oxidation of niobium

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.5, 1961, 761-763

TEXT: The authors investigated the oxidation of metallic niobium in air in the temperature range 700 to 1200°C. The kinetic measurements were made by the method of continuous weighing; the phase composition of the products of oxidation were determined by means of X-rays, with Fe-K α -radiation, by the Debye method using cylindrical and flat specimens. The kinetic measurements confirmed the results obtained earlier by W. Klopp, C.T. Sims and R. J. Jaffee (Ref.4: J. Trans. ASM, 1959, 51, 282) on the linear increase of scale and the anomaly of the oxidation speed at 800°C. According to Klopp et al., this anomaly may be due to the geometry of the specimen, to differences in the air humidity from one test to another and to sintering of the scale at high temperatures. The authors of this paper studied the kinetics of oxidation on specimens of various shape, applying various air

Card 1/2

32659

On high temperature oxidation ...

S/12 12/005/019/028

E07

humidities. It was found that these factors do not have any appreciable influence on the character and distribution of the kinetic curves: in all cases a larger weight increment was observed at 800°C than at 1000 and 1100°C. Since above 800°C $\alpha \rightarrow \beta$ transformation takes place, the slowing down in the oxidation of niobium in air and oxygen above this temperature is more likely to be due to polymorphous transformation. The α -modification is metastable and in the transition temperature range (800 to 900°C) its lattice is distorted and, consequently, diffusion through it is easier. However, diffusion through the lattice of the stable β -modification is slower and therefore there will be a considerable drop in the speed of oxidation at 900°C as compared to the speed of oxidation at 800°C. There are 1 figure and 4 references: all non-Soviet-bloc. The English-language references read as follows: Ref.2: Holtzberg F. Reisman A., Berry M. and Merlin Berkenblit, J.Amer.Chem.Soc., 1957, 79, 2039; Ref.3: Goldsmidt H.J. J.Inst.Met., 1958-1959, 87, 235. Ref.4: Quoted in text.

ASSOCIATION: Ural'skiy gosudarstvennyy universitet im.A.M.Gor'kogo
(Ural State University imeni A.M.Gor'kiy)

SUBMITTED: July 17, 1961

Card 2/2

ACCESSION NR: AT4013963

S/2659/63/010/000/0264/0269

AUTHOR: Gerasimov, A. F.; Ushkova, T. V.; Shkerin, N.

TITLE: X-ray investigation of high-temperature oxidation of niobium-molybdenum-chromium alloys

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 10, 1963, 264-269

TOPIC TAGS: niobium, molybdenum, chromium, oxidation, niobium oxidation, roentgenography, high temperature oxidation

ABSTRACT: The high rate of niobium oxidation interferes with its use as a structural material. Many investigations have recently been published on high-temperature niobium oxidation. In the present work, alloys containing niobium, molybdenum and chromium, prepared at the Institut metallurgii im. A. A. Baykova (Metallurgical Institute), were oxidized at temperatures between 800C and 1200C. In some tests kinetic measurements were made, while in all tests roentgenography was used to determine the content of the oxidized products. The X-rays were taken by the powder method in a standard apparatus, using a flat sample. It was found that the combination of niobium, molybdenum and chromium led to higher resistance against oxidation in the temperature range 800C to 1200C. The

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ACCESSION NR: AT4013963

X-ray analysis showed that during the oxidation of triple alloys, a scale of Nb_2O_5 formed on the pure niobium. This oxide appeared in two modifications, α and β , the presence of which leads to an unusually high rate of oxidation of Nb at 800C. Their effect of molybdenum and chromium on the oxidation of niobium is connected with the dissolution in the oxide lattice. Hypothesis are put forward about the mechanism of oxidation of niobium, as well as the oxidation of niobium alloys. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy AN SSSR)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 00

SUB CODE: MM

NO REF SOV: 003

OTHER: 006

Card 2/2

GHERASIMOV, A.G., (Baku); YUZBASHEV, S.G.(Baku)

~~_____~~
Economic type of gas stove for small-sized apartments. Vol.1 san.
tekh.no.1:36 Ja '57. (MIRA 10:3)
(Stoves, Gas)

GERASIMOV, A.G.

Planning low-pressure gas lines for city blocks and sections
in Baku, Gaz.prom. [no.11]:32-33 '57. (MIRA 10:12)
(Baku--Gas distribution)

GERASIMOV, A.G., kand. tekhn. nauk; TATSIYENKO, P.A., inzh.

Industrial testing of "Lisakovskiy" deposit brown hematites to
determine the possibility of their beneficiation. Gor.zhup.
no.11:44-50 N '48. (MIRA 11:11)

1. Zavod Sibelektrostal'.
(Ore dressing) (Hematite)

AKATOV, A.I., OBRASIMOV, A.G., TATSIYENKO, P.A.

Beneficiation of "Lisskovskiy" deposit brown ores at the
"Sibelektrostal'" ore dressing pilot plant. Obog. rud 2 no. 6:23-
30 '57. (MIRA 11:8)

(Kustanay Province--Iron ores)
(Ore dressing)

GERASIMOV, A.G.

133-7-1/28

AUTHOR: Gerasimov, A.G., Candidate of Technical Sciences.

TITLE: Possibilities of the Production of Pig Iron in Electric
Furnaces (Perspektivy proizvodstva chuguna v elektropetchakh)

PERIODICAL: Stal', 1957, No.7, pp. 577 - 579 (USSR)

ABSTRACT: On the basis of literature and experience in operating the electric iron smelting furnace on the "Sibelektrostal'" Works, the author discusses problems involved in the large-scale production of pig iron in electric furnaces, namely, the preparation of raw materials for smelting, supply of power for the metallurgical process and some design difficulties (large cross-sectional area of the hearth required for a large output). It is concluded that the main difficulty in the development of electric blast furnaces (in addition to the cost of power) is the supply to the bath of a large amount of electric power. Until this problem is solved, any large-scale development of the smelting method is not expedient. In some individual cases (e.g. Angaro-Zniseskiy region) some developments of the electro-smelting of pig iron can be carried out with the furnaces used at present. In view of many unsolved problems of a technological and design nature the construction of a small, experimental electric furnace is recommended. There are

Card1/2 6 Slavic references.

133-7-1/28

Possibilities of the Production of Pig Iron in Electric Furnaces.

ASSOCIATION: Krasnoyarsk Works "Sibelektrostal'" (Krasnoyarskiy
Zavod "Sibelektrostal'")

AVAILABLE: Library of Congress.

Card 2/2

SCIV/137-59-3-5202

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 38 (USSR)

AUTHORS: Gerasimov, A. G., Suslikov, G. F., Tatsiyenko, P. A.

TITLE: On the Utilization of Iron Ores of the Nizhne-Angarskiy Ore Body
(K voprosu ob ispol'zovanii zheleznykh rud Nizhne-Angarskogo mestorozhdeniya)

PERIODICAL: Tekhn.-ekon. byul. Sovnarkhoz Krasnoyarskogo ekon. adn. r-na, 1958, Nr 2, pp 12-15

ABSTRACT: The final results of concentration of ore by the gravitation-flotation and magnetic-roasting methods under laboratory conditions are adduced. The calculations performed serve to substantiate the proposed immediate exploitation of the Nizhne-Angarskiy iron-ore body.
M. M

Card 1/1

OV-127-58-9-10/80

AUTHORS: Gerasimov, A.G., Suslikov, G.F., Tatsiyenko, F.A. and
~~Medvedkov, A.I.~~

TITLE: New Data on the Concentration of Iron Ores of the Nizhnyaya
Angara Deposits (Novyye dannyye po obogashcheniyu zheleznykh
rud Nizhne-Angarskogo mestorozhdeniya)

PERIODICAL: Gornyy zhurnal, 1958, Nr 9, pp 56-62 (USSR)

ABSTRACT: Data on the concentration processes of the Nizhnyaya Angara
iron ore deposits have been collected and studied during the
last 10 years by the Instituty Mekhanobr, Uralmekhanobr i Si-
birskiy metallurgicheskiy institut (The Mekhanobr, Uralmekhanobr
Institutes and the Siberian Metallurgical Institute) and as a
result two rational methods of concentration have been proposed:
gravity-flotation and magnetic-roasting methods. Comparative
results are shown in table 1. After technical and economical
calculations, the Mekhanobr, represented by N.P. Titkov, I.N.
Kachan, G.I. Yudenich, E.S. Bogdanova, V.F. Sevel'yev, Engineer
Ruchkin and D.I. Frantsuzov, recommended the gravity-flotation
method. Although these findings were confirmed by laboratory
tests conducted in the Krasnoyarsk Plant 'Sibelektrosta' by
M.D. Kosul'nikov, V.S. Tomilin, A.M. Komlev, A.D. Komleva,

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SOV-127-58-9-10/20

New Data on the Concentration of Iron Ores of the Nizhnyaya Angara Deposits

M.G. Kurochkin, N.S. Kosul'nikova, A.S. Kozhevnikov, S.M. Luk'yanov, V.B. Lutsiyan, V.V. Makarov, D.Ye. Nacheporenko, and G.L. Suslikova in 1957-58, they also found the possibility of obtaining much better results of the concentration by the magnetic-roasting method. According to their findings, the optimum degree of reduction of roasted ore is in the 120-150 % range, as compared with 83-102 % findings of the Mekhanobr (Fig. 1). Research on various reducers showed that the best results of reducing were obtained when coal was used as fuel. Its use allowed the necessary degree of reduction to be obtained at a temperature of 650-700°, which must have been much higher when gas was used as a fuel. As the Krasnoyarsk region has huge reserves of brown coal, it was decided to use only the magnetic-roasting method. Brown coal consumption amounted to 8.1 % of the processed ore on the average. The low cost of brown coal makes this method highly profitable. The crushed ore of class minus 12 mm was subjected to the magnetic-roasting process; after that it was divided into two classes of plus 2 mm and minus 2 mm. The ore of class plus 2 mm was then subjected to the dry magnetic separation and the obtained concentration, together with ore of class minus 2 mm,

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SOV-127-58-9-10/20

New Data on the Concentration of Iron Ores of the Nizhnyaya Angara Deposits

was again subjected to wet magnetic separation. Further concentration operations were continued, according to two schemes elaborated by the Mekhanobr Institute (Fig. 2) and the Sibe-
elektrostal' Plant (Fig. 3). Best results were obtained with ores reduced by 120-150 % (Table 3). After testing the obtained concentrates with various iron ores of the Nizhnyaya Angara deposits, the Sibelektrostal' Plant proposed a general method of concentration for all ores of the region. The cost of cast iron obtained from the concentrates (Table 7) of ores of the Nizhnyaya Angara deposits is, after the Magnitogorsk cast iron, the lowest in the Union. There is 1 graph, 7 tables and 5 schemes.

ASSOCIATION: Krasnoyarskiy zavod Sibelektrostal' (The Krasnoyarsk Sibelektrostal' Plant); Krasnoyarskoye geologicheskoye upravleniye (The Krasnoyarsk Geological Administration)

1. Iron ores--Processing

Card 3/3

AUTHORS: ^{SOV/133-58-10-5/31}
Tatsjenko, P.A., Engineer and Gerasimov, A.G., Candidate
of Technical Sciences

TITLE: From Experience in Magnetising Roasting of Iron Ores in a
Rotary Kiln (Opyt magnitiziruyushchego obzhiga zheleznykh
rud v trubchatoy vrashchayushchey pechi)

PERIODICAL: Stal', 1958, Nr 10, pp 877 - 882 (USSR)

ABSTRACT: Experience in operating a Lurgi-type rotary kiln designed
by Soyuzteplostroy in 1954 for magnetising roasting of
iron ores is described. The kiln is 30 m long, 2.2 m
outside diameter and can rotate with 0.64, 0.46 and 0.33
rpm, fired with producer gas. The degree of reduction in
% is expressed by the proportion of ferric oxide trans-
formed into magnetite:

$$r = \frac{\text{Fe}^{2+}}{\text{Fe}_{\text{total}}} \cdot 3 \cdot 100 .$$

Optimum roasting conditions for various ores were estab-
lished. It is pointed out that in order to obtain high
indices for the beneficiation process, the roasting should
be carried out with some degree of over-reduction (up to

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SOV/133-58-10-5/31

From Experience in Magnetising Roasting of Iron Ores in a Rotary Kiln

110-150%). The optimum degree of reduction for each type of ores should be experimentally established. It is advantageous to treat Kerch' Tabachnyye Ores, Akkermanovskiye and Lisakovskiye brown ironstones by a reducing-oxidising roasting (reducing to Fe_3O_4 and then oxidising in stream of air at 550 - 700 °C to $\gamma\text{-Fe}_2\text{O}_3$). All the ores tested and particularly those difficult to reduce can be successfully roasted with a solid reducing agent. Brown coal is particularly suitable for the purpose. The output of the kiln and its efficiency can be substantially increased by improving thermal insulation of the working space and air tightness of the charging end. However, a number of deficiencies of the kiln (low durability of the peripheral burners, insufficient contact between the ore and reducing atmosphere, short length of the heat-exchange zone, complexity and low reliability of the gas

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SOV/133-58-10-5/31
From Experience in Magnetising Roasting of Iron Ores in a Rotary Kiln
and air supply systems) can be removed only by fundamentally
changing the technology of roasting, e.g. transfer to a
solid reducing agent.
There are 2 tables, 4 figures and 10 Soviet references.

ASSOCIATION: Krasnoyarskiy zavod "Sibelektrostal"
("Sibelektrostal'" Works in Krasnoyarsk)

Card 3/3

SOV/12"-58-11-9/16

AUTHORS: Gerasimov, A.G., Candidate of Technical Sciences and Tatsi-
yenko, P.A., Engineer

TITLE: Industrial Concentration Tests of Lisakovo Brown Iron Ores
(Promyshlennyye ispytaniya lisakovskikh burykh zheleznyakov
na obogatimost')

PERIODICAL: Gornyy zhurnal, 1958, Nr 11, pp 44 - 50 (USSR)

ABSTRACT: The Mekhanobr and the Uralmekhanobr Institutes studied various schemes for the concentration of Lisakovo brown iron ores. Different types of ores of the deposit were tested at the experimental mill of the Sibelektrostal' Plant and the results of these tests (Tables 1-9) showed that the best concentration was obtained by the magnetic - roasting method. The following scientists took part in these tests: Candidates of Technical Sciences V.I. Karmazin and F.S. Suvorov, Engineers D.I. Frantsuzov, P.P. Yurov, M.D. Kosul'nikov, M.G. Kurochkin, S.M. Luk'yanov, V.V. Makarov; A.I. Akatov

Card 1/2

SOV/127-58-11-9/16

Industrial Concentration Tests of Lisakovo Brown Iron Ores

Mekhanobr) and I.Ya. Bruk and V.M. Yermakova (Uralsmekhanobr).
There are 9 tables, 3 graphs and 3 Soviet references.

ASSOCIATION: Zavod Sibelektrostal' (The Sibelektrostal' Plant)

Card 2/2

1. Iron ores--Processing

TYURENKOV, N.G., kand.tekhn.nauk; GERASIMOV, A.G., kand.tekhn.nauk;
LUK'YANOV, S.M.

Flowsheet used for the dressing of Korshunikhha ores. Gor.zhu'.
no.7:69-71 J1 '60. (MIRA 13:7)

1. Uralmekhanobr, Sverdlovsk (for Tyurenkov). 2. Zavod Sibeлектро-
stal', Krasnoyarsk (for Gerasimov, Luk'yanov).
(Korshunikhha Valley--Iron ores)
(Ore dressing)

GERASIMOV, A.G., kand.tekhn.nauk; TATSIYENKO, P.A., kand.tekhn.nauk;
LUK'YANOV, S.M., inzh.; RYBAKOV, V.N., inzh.

Industrial testing of iron-titanium-vanadium ores of the
"Iysanskiy" deposit. Gor.zhur. no.10:59-60 0 '60. (MIRA 13:9)

1. Kraenoyarskiy zavod "Sibelektrostal'". (Mineralogy, Determinative)
(Ilseinite--Analysis)

33095

S/638/61/001/000/018/056
B104/B138

24.6700
AUTHORS:

Gerasimov, A. G., Gorbunov, A. N., Dubrovina, V. A., Kaipov, D., Kuvatov, K., Orlova, A. I., Osipova, V. A., Sakovich, V. A., Silayeva, V. S., Fomin, Yu. A., Cherenkov, P. A.

TITLE:

Study of photodisintegration of nitrogen, oxygen, and neon

SOURCE:

Tashkentskaya konferentsiya po mirnomy ispol'zovaniyu atomnoy energii. Tashkent, 1959. Trudy. v. 1. Tashkent, 1961, 134 - 153

TEXT: The photodisintegration of N_7^{14} , O_8^{16} , and N_{10}^{20} was studied by means of a Wilson chamber in a magnetic field acting directly on the bremsstrahlung beam. In order to be able to distinguish reactions γp are γpn and record the recoil nuclei, the Wilson chamber was filled with a mixture consisting of the gas to be investigated (nitrogen or neon) and hydrogen. Reduced pressure was used in experiments with oxygen. In experiments with nitrogen, oxygen, and neon, the stopping power for protons was 0.65, 0.31, and 0.50 relative to air. The mean energy of the photo-
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S/638/61/001/000/018/056

B104/B138

Study of photodisintegration ...

protons from γ pn reactions was lower than that from γ p reactions. The effective cross sections were calculated; their shape indicates the importance of transitions in the residual nuclei. The proton angular distribution from γ pn reactions is nearly isotropic for low proton energies. For high proton energies (>20 Mev), it is very similar to that in deuterium photodisintegration. The proton angular distribution from γ p reactions is approximately isotropic for N_7^{14} and O_8^{16} at low energies. In the expression

$d\sigma/d\Omega \sim A(1+B/\text{Asin}^2\theta+C/\text{Asin}^2\theta\cos\theta+D/\text{Acos}\theta)$, the effect of the last three terms in parentheses increases for higher energies. The isotropic part of the angular distribution is greater for N_{10}^{20} than for the two other isotopes. An abnormally high yield of the γ pn reaction was found for N_7^{14} ;

it is attributed to interaction of a photon with a pair of "valency" nucleons in the outer shell, which are in the $1p_{1/2}$ state with parallel spins. During photon absorption, the electric dipole absorption plays an essential part in N and O nuclei. The logarithmic moments of the photon-absorption cross sections are in good agreement with results obtained on the basis of an independent-particle model Yu. K. Khokhlov

Card 2/4₃

X

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S/638/61/001/000/018/056
B104/B138

Study of photodisintegration ...

(DAN, SSSR, 1954, 97, 239; ZhETF, 1957, 32, 124) and A. B. Migdal (ZhETF, 1945, 15, 81) are mentioned. There are 9 figures, 7 tables, and 22 references: 8 Soviet and 14 non-Soviet. The four most recent references to English-language publications read as follows: Livesey L. L. Canad. Journ. Phys., 35, 9, 1957; Rhodes, Stephens W. E. Phys. Rev., 110, 1415, 1958; Elliot, Flowers B. H. Proc. Roy. Soc., A. 242, 57, 1957; Svantesson N. L. Nucl. Phys., 3, 273, 1957.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva AN SSSR (Physics
Institute imeni P. N. Lebedev AS USSR)

Card 3/4

X

GERASIMOV, A.G.

12-3-2/40

AUTHORS: Gerasimov, A.G., Gorbunov, A.N., Ivanov, Yu.S.,
Kutsenko, A.V., Spiridonov, V.M.

TITLE: A Wilson Chamber for Work in the Beam of Cyclotron Radiation and the Auxiliary Apparatus (Kamera Vil'zona dlya raboty v puchke izlucheniya sinkhrotrona i vsponogatel'naya apparatura)

PERIODICAL: Priroda i Tekhnika Eksperimenta, 1957, Nr 3, pp.10-14 (USSR)

ABSTRACT: A Wilson cloud chamber which operates in a magnetic field is described. It can be used to study photonuclear reactions. The working regime has already been given in a previous paper (Ref.1). In the present paper a description is given of the various parts of the chamber and of the auxiliary apparatus, i.e., the control apparatus, the apparatus synchronizing the work of the chamber with that of the synchrotron, and the apparatus used to measure the intensity of the emitted pulses which are recorded by the Wilson chamber. An important part of the chamber is an organic film 70 μ thick which serves as the window through which the γ -rays enter the sensitive volume. The film is 30 mm in diameter and can withstand a pressure of the order of 3-4 atmospheres. The method of mounting of the film is shown

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120-3-2/40

A Wilson Chamber for Work in the Beam of Cyclotron Radiation and the Auxiliary Apparatus.

in Fig.1. An electrostatic field of ~ 40 V/cm is established between the glass lid and the bottom of the chamber. This field removes ions formed within the volume of the chamber during irradiation. The pressure in the lower volume of the chamber is stabilised to ~ 0.01 atm. using a mechanical pressure stabilizer shown in Fig.2 and developed by D. V. Ebel'yanov. A detailed description is given of the controlling and synchronizing devices. "Exact" operations (expansion of the chamber, separation of single pulses, illumination, etc.) are controlled by the circuit shown in Fig.4 and the "rough" operations are controlled by the circuit of Fig.5. The absolute beam intensity was obtained by measuring the β activity of a graphite specimen placed in the γ -beam. The chamber was used to study photodisintegration of He at a maximum energy of 170 MeV. A typical photograph of the $\text{He}^4(\gamma)\text{H}^2$ reaction is shown in Fig.7. Thanks are given to P.A.Cherenkov for help and interest. There are 7 figures, no tables and 5 references, of which 3 are Russian and 2 are English.

Card 2/3

1. 1-2/40
A Wilson Chamber for Work in the Beam of Cyclotron Radiation and the Auxiliary Apparatus.

ASSOCIATION. Institute of Physics imeni P.N. Lebedev AS USSR
(Fizicheskii institut im. P.N. Lebedeva AN SSSR).

SUBMITTED: November 3, 1956.

AVAILABLE: Library of Congress.

1. Cloud chambers-Operation

S/057/63/033/003/021/021
B104/B180

AUTHORS: Pavlovskiy, A. I., Skliskov, G. V., Kuleshov, G. D.,
and Gerasimov, A. I.

TITLE: Problem of the dependence of the intensity of a betatron
on the injection energy

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 33, no. 3, 1963, 374 - 376

TEXT: The trapping process at energies up to 300 kev was investigated in connection with the possibility of increasing the yields of betatrons and synchrotrons. Measurements were carried out with an iron free betatron whose magnetic field has no phase-nonuniformities and only 0.5 % azimuthal ones. The betatron intensity was measured for injected electron energies between 40 and 380 kev. The trapping process does not depend on the injection energy. W is linearly dependent on the injection energy up to 120 kev, after which there is a slight deviation from linearity. The deviations are attributed to inadequate emission currents from the injector and to a slight dependence of the maximum intensity on the shape

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S/057/63/033/003/021/021
B104/B180

Problem of ...

and period of the injection pulse. There is 1 figure.

SUBMITTED: June 7, 1962 (initially)

August 23, 1962 (after revision)

Card 2/2

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514810011-0

CH 2/3

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514810011-0"

GERASIMOV, A.I.; YELKIN, G.N.

The PFSH-1,6 pick-up baler mounted on the SSh-75 automotive chassis. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst.nauch.i
tekh.inform. no.5:69-70 '62. (NIRA 15:7)
(Agricultural machinery)

GERASIMOV, A.I.

Hose couplings for mortar pumps. [suggested by A.I.Gerasimov].
Rats. i izobr. predl. v stroi. no. 4:71 '57. (MIRA 11:8)
(Hose couplings)

GERASIMOV, A.I.,

Apparatus for the inhalation of pulverized drugs. Vrach.delo no.6:635
Je '58 (MIRA 11:7)

1. Nikolayevskiy oblastnoy protivotuberkuleznyy disperser (nauchnyy
rukovoditel' - prof. L.A. Zaritskiy).

(INHALATION THERAPY)

(MEDICAL INSTRUMENTS AND APPARATUS)

GERASIMOV, A.I. (Nikolayev).

Device for the intratracheal administration of drugs in powder
form. Vrach.delo no.11:1205 N'58 (MIRA 12:1)

1. Oblastnoy protivotuberkuleznyy dispanser (nauchnyy rukovoditel'
raboty - prof. L.A. Zaritskiy).
(INTRATRACHEAL INJECTIONS)

GERASIMOV, A.I.

Methods for the control of coughing in pulmonary tuberculosis.
Vrach.delo no.2:195 F '60. (MIRA 13:6)

1. Nikolayevskiy oblastnoy protivotuberkuleznyy dispanser.
(TUBERCULOSIS)

GERASIMOV, A.I. [Herasimov, O.I.]

Device for producing volatile fractions of phytoncides. Mikrobiol.
zhur. 22 no.4:70-71 '60. (MIRA 13:11)

1. Iz Nikolayevskogo oblastnogo protivtuberkuleznogo dispansera.
(PHYTONICIDES) (BACTERIOLOGY--APPARATUS AND SUPPLIES)

GERASIMOV, A.I. (Nikolayev)

Inhalation method of administering phthivazid in power form in
pulmonary tuberculosis. Vrach. delo no. 1:124-125 '61.

(MIRA 14:4)

1. Oblastnoy protivotuberkuleznyy dispanser, Nikolayev.
(TUBERCULOSIS) (ISONICOTINIC ACID)

GERASIMOV, A.I.

Intratracheal administration of a suspension of phthivazid with penicillin in cavernous pulmonary tuberculosis. Zhur. ush., r.os. i gorl. bol. 21 no.2:61-67 Mr-Ap '61. (MIRA 14:6)

1. Iz Nikolayevskogo oblastnogo protivotuberkuleznogo dispensera (glavnyy vrach - zaslushennyy vrach USSR A.S.Lyapis), kliniki bolezney ukha, gorla i nosa (zav. - prof. L.A.Zaritskiy) i kafedry tuberkuleza (zav. - dotsent M.N.Taranenko) Odesskogo meditsinskogo instituta imeni N.I.Pirigova.

(TUBERCULOSIS)

(ISONICOTINIC ACID)

(PENICILLIN)

GERASIMOV, A.I.

Apparatus for producing volatile phytonicoid fractions. Zhur,ush.,
nos.i gorl.bol. 21 no.6:70-71 N-D '61. (MIRA 15:11)

1. Iz Nikolayevskogo oblastnogo tuberkuleznogo dispansera.
(PHYTONICIDES)(MEDICAL INSTRUMENTS AND APPARATUS)

BYATETS, Ye.V.; BKLENKO, L.D.; GERASIMOV, A.I.; GOROVENKO, L.I.; DERING,
A.I.; DRAKE, L.V.

Treatment of pulmonary tuberculosis with phthivazide inhalations.
Vrach.delo no.11:141-142 N '62. (MIRA 16:2)

1. Oblastnoy protivotuberkuleznyy dispanser g. Nikolayeva,
pervaya bol'nitsa g. Nikolayeva, tuberkuleznoye otdeleniye i
detskiy tuberkulenny sanatoriya No.1 g. Nikolayeva.
(TUBERCULOSIS) (PHTHIVAZIDE)

GERASIMOV, A.I.

Contrast examination during differential diagnosis in diseases of
respiratory organs. Vrach.delo no.4:133 Ap'63. (MIRA 16:7)

1. Oblastnoy protivotuberkuleznyy dispanser g. Nikolayeva.
(RESPIRATORY ORGANS—RADIOGRAPHY)

GERASIMOV, A.I.; GOROVENKO, L.I.; ZHIVATOVSKIY, P.I.

Complication of pneumoperitoneum circumscribed subdiaphragmatic peritonitis. Vrach. delo no.7:132-133 J1'63. (MIRA 16:10)

1. Oblastnoy protivotuberkuleznyy dispanser g. Nikolayeva.
(TUBERCULOSIS) (PNEUMOPERITONEUM, ARTIFICIAL)
(PERITONITIS)

GERASIMOV, A.I.; SKLIZKOV, G.V.

High-precision shock oscillator. Prib. i tekhn. eksp. 8 no.5:
128-129 9-0 '63. (MIRA 16:12)

GERASIMOV, A.I.

Examination of lavage waters of the bronchi in the differential
diagnosis of diseases of the respiratory organs. Probl. tuberk.
41 no.4:35-38 '63 (MIRA 17:2)

1. Iz Nikolayevskogo oblastnogo protivotuberkuleznogo dispan-
sara (glavnyy vrach - zasluzhennyy vrach UkrSSR A.S. Lyapis).

GERASIMOV, A.I.

Bed for patients : thoracic or cranial surgery. Klin. khir.
no.3:83-85 '65. (MIRA 18:8)

1. Nikolayevskiy oblastnoy protivotuberkuleznyy dispanser.

L 01810-66 EMT(d)/EMT(m)/EMA(d)/EMP(v)/T/EMP(t)/EMP(k)/EMP(h)/EMP(z)/EMP(b)/
EMP(l)/EMA(c) IJP(c) HJW/JI/HM

ACCESSION NR: AP5020157

UR/0135/65/000/008/0037/0038
621.791.037

AUTHOR: Gerasimov, A. I. (Engineer); Kudasov, B. G. (Engineer); Pavlovskiy, A. I. (Engineer); Tsarev, V. P. (Engineer)

TITLE: Electron gun with high current stability

SOURCE: Svirochnoye proizvodstvo, no. 8, 1965, 37-38

TOPIC TAGS: welding, electron beam welding, welding gun, electron gun, gun cathode, tantalum cathode

ABSTRACT: A new type of electron gun for vacuum electron-beam welding has been developed. This gun is equipped with a disk-shaped tantalum cathode 1 mm thick and 8 mm in diameter, with a system for stabilizing the beam current within ± 0.5 mamp. The gun operates with an accelerating voltage of up to 50 kv. At 50 kv a beam current of over 80 mamp can be obtained. At a voltage of 40 kv and a beam current of 110-130 mamp, the beam diameter in the welding plane is 0.5-0.7 mm. Under these conditions the depth of penetration in AMTs aluminum alloy is 25 mm at a weld width of 2.5 mm. The use of a cathode made of pure tantalum instead of lanthanum hexaboride extends the service life of the gun and improves its reliability. Orig. art. has: 4 figures
Card 1/2 [ND]

1 01810-66

ACCESSION NR: AP5020167

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: MM, EIC

NO REF SOV: 000

OTHER: 000

ATD PRESS: 4086

Card 2/2

PAVLOVSKIY, A.I.; KULESHOV, G.D.; SKLIZKOV, G.V.; YZIN, Yu.A.; GERASIMOV, A.I.

Heavy-current air-core betatrons. Dokl. AN SSSR 160 no.1:68-70
Ja '65. (MIRA 18:2)

1. Submitted November 16, 1964.

GERASIMOV, A.K., inzh., red.; PETROV, G.D., doktor tekhn. nauk, red.;
SOVALOV, I.G., kand. tekhn. nauk, red.; STRASHNYKH, V.P., red. izd-va

[Construction norms and regulations] Stroitel'nye normy i
pravila. Moskva, Gosstroizdat. Pt.3. Sec.V. ch.1-2.
[Solid concrete and reinforced-concrete structures] Beton-
nye i zhelezobetonnye konstruksii monolitnye. (SNiP III-V.
1-2-62). 1963. 74 p. (MIRA 16:7)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po de-
lam stroitel'stva. 2. Gosudarstvennyy komitet po delam
stroitel'stva Soveta Ministrov SSSR (for Gerasimov). 3. Mez-
hduvedomstvennaya komissiya po perasmotru Stroitel'nykh norma
i pravil (for Petrov). 4. Nauchno-issledovatel'skiy institut
organizatsii, mekhanizatsii i tekhnicheskoy pomoshchi stroi-
tel'stvu Akademii stroitel'stva i arkhitektury SSSR (for
Sovalov).

(Reinforced concrete construction)
(Concrete construction)

GERASIMOV, A.K., inzh., red.; KOTOV, I.T., kand. tekhn. nauk
red.

[Instructions for preparing and using mortar] Ukazania
po prigotovleniiu i primeneniiu stroitel'nykh rastvorov
(SN290-64). Moskva, Stroiizdat, 1965. 75 p.

(MIRA 18:6)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po
delam stroitel'stva. 2. Gosstroy SSSR (for Gerasimov).
3. Tsentral'nyy nauchno-issledovatel'skiy institut
stroitel'nykh konstruktsiy im. V.A.Kucherenko Gosstroya
SSSR (for Kotov).

GERASIMOV, A.L.; BURKIN, A.S.

Gas supply for standard apartments. Gas.prom.no.10:24-25 D '56,
(Gas distribution) (MLRA 9:10)

GERASIMOV, A.M.

Work practices of technological information specialists at
the Mundybash Plant. Opyt. rab. po tekhn. inform. i prop.
no.3:14-16 '63. (MIRA 16:12)

1. Starshiy tekhnicheskoy informator na Mundybashskoy
agloobogatitel'noy fabrike.

ANAN'YEV, S.L., prof.; AVDEYEV, P.N., inzh.; GERASIMOV, A.M., inzh.

Increasing the operating stability of hydraulic drives. Izv.
vys.ucheb.zav.; mashinostr. no.6:115-126 '59.
(MIRA 13:5)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni
N.E. Bauman.
(Oil hydraulic machinery)

GERASIMOV, A.I.

Ascorbic acid content of the blood and urine in hypothyroid goiter.
Izvest. anich. i gorm. 11 no.2:19-20. Apr-May 55. (SMA 18:7)

1. Kafedra biologicheskoy khimii (rav. - dokt. F.I. Slobodkina)
Oranburskogo meditsinskogo instituta.

GERASIMOV, A.N., podpolkovnik meditsinskoy sluzhby

Diagnosis of some injuries of the acetabulum. Voen.-med.zhur. no.7:
86-87 J1 '56. (MIRA 9:11)

(HIP JOINT—RADIOGRAPHY)

MISCELLANEOUS

"Photographing the Eye Fundus," by A.N. Gerasimov, Eye Clinic of the Saratov Medical Institute (Head of the Chair - Prof. Y.F. Vorob'yev), Vestnik Oftalmologii, No 3, May-June 1957, pp 44-48.

Photography of the eye fundus is not much practiced in the USSR because of the unavailability of simple and suitable equipment.

The author began photographing the eye fundus in 1953; he describes the technique in detail. He used two non-reflecting ophthalmoscopes: Gillstrand's and the Soviet-made "B.O."

Gillstrand's ophthalmoscope is compared with the Soviet-designed B.O. ophthalmoscope, which is supposed to be a simplified model of the former. Gerasimov says that photographs obtained by using Gillstrand's ophthalmoscope are free from any reflection whatever, while those made by means of the B.O. ophthalmoscope have a reflection produced by the ophthalmoscopic lens.

One drawing and 5 photographs are included in the article.

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L 10230-65

ACCESSION NR: AF 4048293

shape of amplitude-phase characteristics of the open loop of one channel; the Nyquist criterion is applied. Orig. art. has: 3 figures and 19 formulas.

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514810011-0

Card 2/2

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514810011-0"

GERASIMOV, A.N. (Moskva).

Kinetics of the stretching process. Izv. AN SSSR. Otd. tekhn. nauk
no. 12: 57-71 D '56. (MLRA 10:1)
(Textile fibers) (Strains and stresses)

AUTHOR: Gerasimov, A. N. (Moscow)

24-5-6/25

TITLE: Kinetics of the process of drawing. (Kinetika protsessa vytyagivaniya. II)

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.5, pp.56-61 (U.S.S.R.)

ABSTRACT: In an earlier paper (1) the stationary process of drawing was considered assuming the absence of intermediate velocities of separate fibres. Strictly speaking such a process never takes place and an attempt is now made to remove this restriction. As before, the thread is assumed to be drawn over two pairs of rollers. It is shown that

$$\frac{\partial(\lambda v)}{\partial x} = -\frac{\partial \lambda}{\partial t} \quad (\text{continuity eq.})$$

$$F(x, t) = q(x, t) v(x, t) - q(0, t) + \int_0^x \frac{\partial q(\xi, t)}{\partial t} d\xi$$

$$\frac{\partial (F - \lambda v^2)}{\partial x} = \frac{\partial(\lambda v)}{\partial t} \quad (q = \lambda v)$$

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where $\lambda(x, t)$ - mean linear density of mass of the thread,
 $q(x, t)$ - linear density of momentum,

Kinetics of the process of drawing. (Cont.) 24-5-6/25

$v(x,t)$ - velocity of thread,

$F(x,t)$ - the force acting on the section $(0,x)$ of the thread.

The last of the above three equations is the general equation of motion of a strained thread. There are experimental methods of determination of λ , q , and v , for example, the radio-active tracer method. The following results are established:-

1) The determination of q , v and F if $\lambda(x,t)$ and $q(0,t)$ are known:-

$$q(x,t) = q(0,t) - \int_0^x \frac{\partial \lambda(\xi,t)}{\partial t} d\xi$$

$$v(x,t) = \frac{1}{\lambda(x,t)} \left(q(0,t) - \int_0^x \frac{\partial \lambda(\xi,t)}{\partial t} d\xi \right)$$

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$$F(x,t) = q(x,t)v(x,t) - q(0,t)v(0,t) + \int_0^x \frac{\partial q(\xi,t)}{\partial t} d\xi$$

These three equations determine q , v , and F if λ is known. In addition

Kinetics of the process of drawing. (cont.) 24-5-6/25

$$B(l,t) = \frac{v(l,t)}{v(0,t)} = \frac{\lambda(0,t)}{\lambda(l,t)} \left\{ 1 - \frac{1}{q(0,t)} \int_0^l \frac{\partial \lambda(\xi,t)}{\partial t} d\xi \right\}$$

2) The determination of λ , v and F if $q(x,t)$ and $\lambda(x,0)$ are known:-

$$\lambda(x,t) = \lambda(x,0) - \int_0^t \frac{\partial q(x,\tau)}{\partial x} d\tau$$

$$v(x,t) = \frac{q(x,t)}{\lambda(x,t)}$$

$$F(x,t) = q(x,t) v(x,t) - q(0,t) v(0,t) + \int_0^x \frac{\partial q(\xi,t)}{\partial t} d\xi$$

In addition:

Card 3/4 $B(l,t) = \frac{v(l,t)}{v(0,t)} = \frac{q(l,t)}{q(0,t)} \lambda(0,t) \left(\lambda(l,0) - \int_0^t \frac{\partial q}{\partial x} \Big|_{x=l} d\tau \right)^{-1}$

3) The determination of $\lambda(x,t)$ and $v(x,t)$. It is shown that

Kinetics of the process of drawing. (Cont.) 24-5-6/25

$$\lambda(x,t) = \sum_{k=0}^{\infty} \frac{(-1)^k}{v(x,t)} \int_0^t \frac{\partial}{\partial t} \dots \frac{1}{v(x,t)} \int_0^t \left[\varphi(t) \frac{v(0,t)}{v(x,t)} \right] dx \dots dx$$

$k \text{ times}$

where

$$\lambda(x,t) \Big|_{x=0} = \varphi(t)$$

There are three Slavic references.

SUBMITTED: January 3, 1957.

AVAILABLE:

Card 4/4

AUTHOR: Gerasimov, A. N. (Moscow) SOV/24-58-5-17/31
TITLE: On the Speeds of Fibres During the Process of Drawing
(O skorostyakh volokon v protsesse vytyagivaniya)
PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh
Nauk, 1958, Nr 5, pp 100-103 (USSR)
ABSTRACT: In an earlier paper (Ref 2) three dynamic equations were
given which should simultaneously satisfy four functions
of the coordinates x and the time t irrespective of what
is being drawn. The sought fourth equation should
reflect the physical nature of the drawn object and it was
stated that this equation could be obtained experimentally
by measuring the mass flow rate per second and the linear
density of the strip in various cross sections of the
field and during various instants of time. In this paper
this fourth equation, Eq.(14), p.103, is derived; the
terminology and the symbols are the same as those used
in earlier work (Refs 1 and 2). In one of his earlier
papers (Ref 1) the author investigated a steady state
process for which the sliding of fibres in the clamping
device was not excluded. In this paper the case is
considered for which sliding of the fibres in the clamping
Card 1/2 device is excluded; for this case the equation derived

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On the Speeds of Fibres During the Process of Drawing

on the basis of Eq.(14) is the same as that obtained in the earlier mentioned paper on the basis of other considerations. In principle it is now possible to determine all the four unknown functions of the independent variables x and t .

There are 2 Soviet references.

ASSOCIATION: Moskovskiy tekstil'nyy institut
(Moscow Textile Institute)

SUBMITTED: December 2, 1957

Card 2/2

AUTHOR: Gerasimov, A.N. (Moscow)

SOV/24-58-6-22/35

TITLE: ~~The Quasi-Stationary Process of Operation~~ of an Extrusion Tool (Svazistatsionarnyy protsess raboty vytyazhnogo pribora)

PERIODICAL: Izvestiya Akademii Nauk SSSR Otdeleniye Tekhnicheskikh Nauk 1958, Nr 6, pp 118-119 (USSR)

ABSTRACT: A system of four equations previously given by the author is discussed. These define the four quantities q , the time of flow of mass of the material which is being drawn, λ the linear density, v the velocity, F the force and $B(t)$ the full extension at time t . The four equations, which are quite general, are discussed in relation to the drawing tool so that some information can be obtained about the four quantities which they define, without actually solving the equations. It is shown that if the two functions $qv - F$, and λ each depend only on the single quantity u which in turn is a

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SOV/24-58-6-22/35

The Quasi-Stationary Process of Operation of an Extrusion Tool

function only of the two variables x and t , then the process is described by the one-dimensional wave equation.

There are 1 figure and 2 Soviet references.

SUBMITTED: DEcember 4, 1957

Card 2/2

GERASIMOV, A.N. (Sverdlovsk)

Universal splint for injuries to the head and spine. Ortop.travm.
i protsz. no.6:59-60 '61. (MIRA 14:8)
(SPLINTS (SURGERY)) (SPINE---WOUNDS AND INJURIES)
(HEAD---WOUNDS AND INJURIES)

GERASIMOV, A.N. (Leningrad)

Choice of parameters of two-channel servosystems with anti-symmetrical couplings. Izv. AN SSSR. Otd. tekhn. nauk. Energ. i avtom. no.1:138-142 Ja-F '62. (MIRA 15:3)
(Servomechanisms)